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TRANSLATION

From : Russian Into English

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On this day personally appeared before me who, after being duly sworn, deposes and states:

That I, Charles Edward Sitch, BA, Authorized Officer of **LAWYERS' AND MERCHANTS' TRANSLATION BUREAU** declare

That to the best of my knowledge and belief, the attached document, prepared by one of its translators competent in the art and conversant with the Russian and English languages, is a true and correct translation into the English language of the accompanying document.

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SEP 14 2009

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Commission expires July 27, 2010

METHOD FOR PURIFYING GASES FROM CARBON DIOXIDE

Union of Soviet Socialist Republics [emblem] State Committee of the USSR Council of Ministers for Inventions and Discoveries	**SPECIFICATION OF AN INVENTION** **FOR AN INVENTOR'S CERTIFICATE** (61) Supplementary to inventor's certificate – (22) Filed on 07.03.70 (21) 1453489/23-26 with incorporation of application No. – (23) Priority – (43) Published on 05.05.76. Bulletin No. 17 (45) Date specification published 05.17.76	(11) 512785 (51) Int. Cl.[2] B 01 D 53/14 (53) UDC 66.074.3 (088.8)

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(54) METHOD FOR PURIFYING GASES FROM CARBON DIOXIDE

The invention relates to a method for purifying gases,

for example the converted gas in ammonia production, from carbon dioxide.

A method is known for purifying gases from carbon dioxide by absorption in an aqueous solution of amines, with the subsequent regeneration of the absorbent.

The disadvantages of the known method include the high heat requirement for the regeneration of the absorbent and the fairly low degree of gas purification (4×10^{-3} vol-% of CO_2).

The aim of the invention is to eliminate the stated disadvantages, which is achieved by conducting the regeneration of the absorbent at a pressure of 5-95 atm.

Example 1

Converted gas containing 20 vol-% of CO_2 was fed into an absorber at a pressure of 30 atm, and a 20% aqueous solution of monoethanolamine (MEA), which had been cooled to 60-80°C in a heat exchanger and to 20-50°C in a cooler, and which had a carbonization degree of 0.6-0.7 mol of CO_2 per mol of MEA, was introduced into the absorber in countercurrent at a pressure of 30 atm. The purified converted gas, removed from the upper part of the absorber, contained 3% of CO_2 and was further purified to obtain a gas with a CO_2 content of 4×10^{-3}%. The saturated solution of MEA, with a carbonization degree of 1.0-1.2 mol of CO_2 per mol of MEA, was removed from the lower part of the absorber and fed into a regenerator, after heating the solution to 119°C in a heat exchanger

operated with hot regenerated solution.

The CO_2 was desorbed in the regenerator to a carbonization degree of 0.6-0.7 mol of CO_2 per mol of MEA at a pressure of 30 atm and a temperature of 129°C. The regeneration required (500-600) x 10^3 kcal per tonne of ammonia obtained. The desorbed CO_2 was fed into a gas turbine at the regeneration pressure, and 60-85 kW-hour of electrical energy was generated per tonne of ammonia obtained.

Example 2

Converted gas containing 20 vol-% of CO_2 and having a pressure of 15 atm was fed into the absorber from below, and a 20% aqueous solution of MEA coming from the regenerator was introduced from above in countercurrent at a pressure of 30 atm after cooling it to 60-80°C in a heat exchanger and to 20-50°C in a cooler, the carbonization degree of the MEA solution being 0.1 ml of CO_2 per mol of MEA. The purified converted gas contained 4 x 10^{-3}% of CO_2. The MEA solution, with a carbonization degree of 0.65 mol of CO per mol of MEA was heated to 110-120°C in a heat exchanger and fed into the regenerator.

The CO_2 was desorbed in the regenerator to a carbonization degree of 0.1 mol of CO_2 per mol of MEA at a pressure of 30 atm and at a boiler temperature of 150-160°C.

The table shows the comparative data for the purification of gases from CO_2 by the known method and by the

proposed method when the starting gases contain 20-30% of CO_2 and the MEA concentration of the solution is 20%.

Method	Pressure, atm		Amount of CO_2 in the purified gas (vol-%) after		Regeneration temperature, °C	Heat consumption in 1 absorption stage, kcal/t of ammonia
	absorption	regeneration	stage I	stage II		
Known	30 1.8		3.0	4×10^{-3}	120	1,500,000
Proposed	30	30.0	3.0	4×10^{-3}	129	500 000-600,000
	15	30.0	4×10^{-3}	-	150	1,200,000
	4	5-6	0.5	4×10^{-3}	129	1,100,000
	30	95.0	3.0	4×10^{-3}	160	1,000,000

Claims

Method for purifying gases from carbon dioxide by absorption in an aqueous solution of amines with the subsequent regeneration of the absorbent, **characterized in that**, in order to increase the degree of purification and reduce the heat consumption, the regeneration is carried out at a pressure of 5-95 atm.